

REMARKS

Claims 1-31 are pending in the subject application. Claims 1-31 have been rejected under 35 U.S.C. § 102(b) and 35 U.S.C. § 103 as detailed below. For the reasons given below, applicants respectfully traverse each of the rejections.

Rejected Claims 23 and 27 have been canceled above and therefore their outstanding rejection under 35 U.S.C. § 102(b) and/or 35 U.S.C. § 103 is moot.

Dependent Claims 29, 30 and 31 have been amended to clarify that they depend from the apparatus Claim 28.

Claims 1-5, 11, 13, 14, 22-25 and 27-31 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,396,467 to Anthony. For the following reasons, applicants respectfully traverse this rejection.

Independent Claims 1, 24, and 25 are directed to a process for depositing metal structures and each recite a step of:

supplying net forward electroplating power between the exposed surface of the workpiece and an anode...

Independent Claim 28 recites an electroplating apparatus that includes:

a power supply for supplying electroplating power between the surface of the workpiece and the anode to electroplate the metal ions...

The subject matter of these independent claims is novel over Anthony because Anthony fails to teach supplying electroplating power or a power supply for supplying electroplating power. Anthony relates to an electroforming process which is described by Anthony as being distinct from an electroplating process. See Anthony at Col. 7, lines 40-47. In view of the failure of Anthony to disclose a process or apparatus that employs electroplating as a means for depositing a metal, independent Claims 1, 24, 25, and 28 are novel over Anthony. Claims 2-5, 11, 13, 14, 22, 23, 27, and 29-31 ultimately depend from either independent Claims 1, 24, 25,

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and 28, and therefore, these dependent claims are novel over Anthony for the same reasons that the base independent claim is novel over Anthony.

Claims 1, 8, 13, 23, and 27 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,219,787 to Carey et al. For the following reasons, applicants respectfully traverse this rejection.

Independent Claim 1, from which rejected dependent Claims 8 and 13 depend, recites:

reversing the electroplating power supplied between the anode and the exposed surface of the workpiece for at least a portion of a second period of time selected to control the deposition of further metal ions over the recessed microstructures relative to the surrounding surface.

Thus, the process of independent Claim 1 reverses the electroplating power for at least a second period of time to control the deposition of further metal ions over the recessed microstructures. Carey et al. does not teach this aspect of the claimed invention. Carey et al. describes that reverse pulse plating is used to "shave back ridge buildups." Carey et al. teaches that reverse pulse plating can be used to remove deposited metal ions. Carey et al. does not disclose that reversing the electroplating power can be used to control the deposition of further metal ions. In view of this failure of Carey et al. to teach each of the features of independent Claim 1, the subject matter of independent Claim 1 and Claims 8 and 13 that depend therefrom is novel over Carey et al.

Claims 6, 7, and 12 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Anthony. For the following reasons, applicants respectfully traverse this rejection.

Dependent Claims 6, 7 and 12 depend from Claim 1 which as explained above recites an electroplating process. As explained above, Anthony discloses a process for electroforming conductors within laser formed holes. Anthony goes to great lengths at Col. 7, lines 40-50 to distinguish his electroforming process from other types of processes, including an electroplating process. Thus, given Anthony's teaching regarding the distinct nature of electroforming

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processes versus an electroplating process, one skilled in the art would not consider Anthony's teaching relating to electroforming to be of interest when considering conditions to be used in a process of electroplating. Anthony does not teach, nor does it suggest depositing a metal structure on a surface of a workpiece using an electroplating process. For these reasons, dependent Claims 6, 7, and 12 are nonobvious over Anthony.

Claims 15-21 and 26 are rejected under 35 U.S.C. § 103 as being unpatentable over Anthony in view of U.S. Patent No. 3,770,598 to Creutz and U.S. Patent No. 5,223,118 to Sonnenberg et al. For the following reasons, applicants respectfully traverse this rejection.

As noted in the Examiner's Action, Claims 15-21 and 26 recite various components of an electroplating bath. Creutz and Sonnenberg et al. are cited for teaching the electroplating bath components recited in Claims 15-21 and 26. This rejection under 35 U.S.C. § 103 is improper because a *prima facie* case of obviousness has not been established by the Office. The record includes no reason why one skilled in the art would be motivated to combine the teachings relating to electroplating of Creutz and Sonnenberg et al. with the teachings of Anthony relating to electroforming. As noted above, Anthony describes an electroforming process, not an electroplating process. Anthony does not suggest that bath compositions useful in an electroplating process would be useful in its electroforming process. Furthermore, neither Creutz nor Sonnenberg et al. teach that their electroplating baths would be useful in the distinct electroforming process of Anthony. For the foregoing reasons, the subject matter of dependent Claims 15-21 and 26 is nonobvious over Anthony in view of Creutz and Sonnenberg et al.

Claims 1, 3-7, 11-14, 22, 23, 25, and 27-31 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Carey et al. in view of Anthony. For the following reasons, applicants respectfully traverse this rejection.

The outstanding rejection should be withdrawn because the Examiner's Action fails to establish a *prima facie* case of obviousness for at least the following reason. The record includes

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no reason why one skilled in the art would be motivated to combine the teachings relating to electroplating of Carey et al. with the teachings of Anthony relating to electroforming, particularly when Anthony teaches that its electroforming process is distinct from an electroplating process. Absent such motivation, a *prima facie* case of obviousness regarding Claims 1, 3-7, 11-14, 22, 23, 25, and 27-31 based on Carey et al. and Anthony does not exist, and the outstanding rejection should be withdrawn.

Claims 9 and 10 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Carey et al. in view of U.S. Patent No. 2,853,443 to Harrover, Jr. or U.S. Patent No. 2,451,341 to Jernstedt. For the following reasons, applicants respectfully traverse this rejection.

Dependent Claims 9 and 10 depend from dependent Claim 8. Claim 8 is novel over Carey et al. for the reasons given above. Dependent Claim 8 has not been rejected as being obvious over Carey et al. Accordingly, in view of the dependence of Claims 9 and 10 from dependent Claim 8, dependent Claims 9 and 10 are novel and nonobvious over Carey et al. in view of Harrover, Jr. or Jernstedt for the same reasons that dependent Claim 8 is nonobvious over Carey et al. For the foregoing reason, the outstanding rejection of Claims 9 and 10 should be withdrawn.

Claims 15-21 and 26 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Carey et al. in view of Creutz and Sonnenberg et al. Rejected Claims 15-21 ultimately depend from independent Claim 1. Independent Claim 1 is patentable over Carey et al. for the reasons given above. Dependent Claims 15-21 are patentable over Carey et al. for the same reasons that independent Claim 1 is patentable over Carey et al. Creutz and Sonnenberg et al. do not provide what is missing from Carey et al. regarding Claim 1.

Turning to independent Claim 26, step (c) of this claim recites:

supplying electroplating power between the anode and the exposed surface of the workpiece during a second time period in a series of forward plating

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power pulses interspersed with reverse plating power pulses to control the deposition of further metal ions over the recessed microstructures relative to the remainder of the surface.

As discussed above, Carey et al. does not disclose supplying reverse plating power pulses to control the deposition of further metal ions over the recessed microstructures. What Carey et al. teaches is the use of reverse plating to remove metal ions that have already been deposited and formed ridge buildups. In contrast, the invention of Claim 26 attempts to control the deposition of the metal ions so that overburdens do not occur. Neither Creutz or Sonnenberg et al. teach or suggest this feature of Claim 26. Accordingly, the subject matter of Claim 26 is nonobvious over Carey et al. in view of Creutz and Sonnenberg et al.

For the foregoing reasons, applicants respectfully request withdrawal of the outstanding rejections and allowance of the application. If the reviewing party has any questions regarding the above, he is invited to call applicants' attorney at the number listed below.

Respectfully submitted,

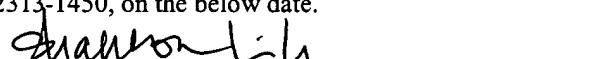
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